

What is claimed is:

1. A fuel system for supplying fuel to an internal combustion engine, the fuel system comprising:
 - a fuel tank having a headspace;
 - an intake manifold of the internal combustion engine in fluid communication with the headspace;
 - a fuel vapor collection canister in fluid communication with the headspace;
 - a purge valve having a first side in fluid communication with the intake manifold and having a second side in fluid communication with fuel vapor collection canister and with the headspace; and
 - a fuel vapor pressure management apparatus including:
 - a housing defining an interior chamber, the housing including first and second ports communicating with the interior chamber;
 - a liquid separating the interior chamber into a first portion in fluid communication with the fuel vapor collection canister and a second portion in fluid communication with a vent port; and
 - a sensor disposed in the interior chamber.
2. The fuel system according to claim 1, wherein the sensor detects a pressure differential between the first and second ports.
3. The fuel system according to claim 2, wherein the sensor detects displacement of the liquid in response to the pressure differential.
4. The fuel system according to claim 1, wherein the housing comprises external and internal walls, the external wall surrounds the interior chamber, and the internal wall projects from the external wall into the interior chamber.

5. The fuel system according to claim 4, wherein the internal wall comprises a tube extending between first and second ends, the first end being fixed to the external wall, and the second end being spaced from the external wall.
6. The fuel system according to claim 5, wherein the first end is in fluid communication with the first port, and the second end of the tube contiguously engages the liquid.
7. The fuel system according to claim 4, wherein the sensor is fixed to the internal wall.
8. The fuel system according to claim 1, wherein the sensor comprises at least one of thermistor, a capacitive switch, a float and contact switch, a magnet and reed switch, a resistive oil switch, an optical switch, and a resistance/conductance detector.
9. The fuel system according to claim 1, further comprising:
an engine control unit operatively connected to the purge valve; and
an electrical connection that couples the sensor with the engine control unit.
10. The fuel system according to claim 1, further comprising:
a contiguous connection between the fuel vapor collection canister and the housing.
11. The fuel system according to claim 10, wherein the contiguous connection is selected from a group consisting of a bayonet connection, a threaded connection, and an interlocking sliding connection.
12. The fuel system according to claim 1, further comprising:
a remote connection extending between the fuel vapor collection canister and the housing spaced from the fuel vapor collection canister.
13. The fuel system according to claim 12, wherein the remote connection is selected from a group consisting of a rigid pipe and a flexible pipe.
14. A method of managing fuel vapor pressure in a fuel system, the fuel system including a fuel vapor collection canister in fuel vapor communication with a headspace of a fuel tank and a

purge valve, and including a pressure management apparatus in air communication between the fuel vapor collection canister and ambient atmospheric conditions, the pressure management apparatus defining a chamber having a first port in air communication with the ambient atmospheric conditions and a second port in air communication with the fuel vapor collection canister, the method comprising:

disposing within the chamber a liquid separating the chamber into first and second portions;

displacing a first volume of the liquid from the first portion of the chamber to the second portion of the chamber in response to a first negative pressure differential between the first and second ports;

displacing a second volume of the liquid from the first portion of the chamber to the second portion of the chamber in response to a second negative pressure differential between the first and second ports, the second volume being greater than the first volume, and the second negative pressure differential being greater than the first negative pressure differential; and

displacing a third volume of the liquid from the second portion of the chamber to the first portion of the chamber in response to a positive pressure differential between the first and second ports.

15. The method according to claim 14, further comprising:

flowing air in a first direction from the first port to the second port during the displacing the second volume of the liquid, the flowing air in the first direction including passing air from the first portion of the chamber to the second portion of the chamber; and

flowing air in a second direction from the second port to the first port during the displacing the third volume of the liquid, the flowing air in the second direction including passing air from the second portion of the chamber to the first portion of the chamber.